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Exposure to Toxic Chemicals Linked to Anxiety, Depression in Kids

More research is needed to determine which chemicals or chemical mixtures are the main culprits so we can better understand how children's exposure to toxic chemicals is contributing to the rising mental health crisis affecting today's youth.

By Environmental Health News

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By Ashley James

Poor mental health and exposure to toxic chemicals are two of the most pressing children's health issues. But are they connected?

I explored this question in a recently published review in Frontiers in Toxicology and discovered a growing body of evidence connecting increased exposure to chemicals in the environment, such as lead, PFAS and BPA, to increased child mental health symptoms like anxiety and depression.

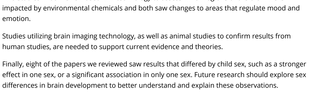
The COVID-19 pandemic heightened an already alarming rate of youth mental health challenges. For example, between 2011 and 2021, the percentage of high school students who reported seriously considering suicide rose from 16% to 22%. Meanwhile, from 2011 to 2020, youth mental health emergency visits nearly doubled.

These trends led the nation's leading pediatric health practitioners to declare a national child and adolescent mental health emergency in 2021. Across the country, this crisis impacts the lives of children and caregivers and strains our healthcare system.

At the same time, we've known for almost two decades that babies are exposed to hundreds of chemicals in the womb. After birth, they can be exposed to even more chemicals in food, drinking water, air, consumer goods and more.

Throughout childhood, but especially in utero and during early years, children are vulnerable to these chemicals, which can disrupt important processes in brain development, including processes related to mood and emotion regulation.

By conducting more research on which chemicals or chemical mixtures are the main culprits, and examining differences in risk by factors like race, sex and economic status, we can better understand this interconnected crisis and give caregivers and children the resources they need to live healthy lives.



The intersection of environment and mental health

Scientists across disciplines increasingly recognize the connection between the environment and mental health.

For example, there is a growing body of research that shows childhood exposure to air pollution can worsen mental health. There's also more research and awareness around the emotional toll environmental destruction and climate change take on youth, referred to as eco or climate anxiety.

However, I noticed much less research and awareness about the potential role environmental chemicals play in adverse mental health outcomes for children and teens.

My co-author and I gathered and described recent literature on prenatal and childhood exposure to environmental chemicals and subsequent mental health outcomes.

We specifically focused on symptoms related to mood, anxiety and behavior disorders, as these are commonly diagnosed disorders for children and teens, yet under-researched in the environmental health field.

This search resulted in 29 studies conducted across five continents on a range of chemicals that fall into three classes (endocrine disruptors, heavy metals and pesticides).

Every study reported at least one statistically significant association between increased exposure to an environmental chemical and increased mental health symptoms, with the most common symptoms being internalizing (e.g., anxiety, depression, somatization, withdrawal) and externalizing (e.g., aggression, impulsivity, conduct disorder) behavior.

Our review identifies several opportunities for researchers to build on these studies to develop a consensus on how the identified chemicals, both individually and together, impact specific mental health outcomes.

Environmental injustice

It's well established that children in low-income and communities of color face increased harmful exposures due to environmental injustice. There are also racial and economic disparities in child mental health outcomes.

For instance, the Centers for Disease Control and Prevention data from 2018 to 2021 reveals higher rates of mental health emergency visits for Black children than for other races.

Despite this, none of the studies in our review discussed environmental injustice or considered race or income in their analysis. We suggest more studies that work in partnership with caregivers and children in environmental justice communities in order to identify potential increased risk.

We also need more research assessing chemical (i.e., environmental toxics) and non-chemical (e.g., psychosocial stress) exposures together. This provides an opportunity to look at combined (or cumulative) risk, as well as explore possible protective factors, like healthy food and quality sleep.

Furthermore, people are typically exposed to more than one chemical at a time, yet only two studies in our review assessed a mixture of chemicals. Studies on chemical mixtures and how different chemicals interact during fetal and childhood development are essential to reflect real-life exposures.

Throughout the review we discuss several hypotheses for ways each chemical harms the developing brain, leading to mental health challenges.

For example, both manganese (a heavy metal) and phthalates (a type of endocrine-disrupting chemical) are thought to disrupt the proper transfer of dopamine, a neurotransmitter that affects factors like mood and motivation.

Two studies in our review used MRI technology to assess which regions of the brain were impacted by environmental chemicals and both saw changes to areas that regulate mood and emotion.

Studies utilizing brain imaging technology, as well as animal studies to confirm results from human studies, are needed to support current evidence and theories.

Finally, eight of the papers we reviewed saw results that differed by child sex, such as a stronger effect in one sex, or a significant association in only one sex. Future research should explore sex differences in brain development to better understand and explain these observations.

Improving children's mental health

Chemical environmental exposures and mental health disorders are both complex. Right now, the mental health of children and teens in the U.S. is in a crisis that not only impacts their health and well-being but also has a ripple effect on healthcare, education, the economy and society at large.

There's evidence to support a link between prenatal and childhood exposure to certain chemicals and adverse mental health.

We need more research to build a strong body of evidence to inform policies, regulations and healthcare practices that can protect our nation's children.

Originally published by Environmental Health News.

Ashley James is a physical scientist for the U.S. Environmental Protection Agency's Office of Ground Water and Drinking Water. This essay was written by Ashley James in her personal capacity.

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the views of Children's Health Defense.

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Laurie
18 days ago
I'm curious as to why with all the talk of "climate change" and air & water pollution due to chemicals, the EPA or anyone else for that matter doesn't address the elephant in the room. The elephant being the chem trails our government and governments around the world are deliberately releasing in the atmosphere from cargo planes. We see them everyday in the form of grids in the sky. This cloud seeding is nothing but chemical warfare on humanity affecting us, crops, livestock and drinking water.

see more

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Gerald Landry
17 days ago
An Embedded statement "For example, both manganese (a heavy metal) and phthalates (a type of endocrine-disrupting chemical) are thought to disrupt tha pre proper transfer of dopamine, a neurotransmitter that affects factors like mood and motivation."
Manganese is a Nutritional Mineral but @ ToXic levels is a problem! Manganese Replaced Lead in Gasoline so is inhaled along Roadways along with Carbon monoxide is implicated in the onset of Parkinsons Disease!
In Occupational Disease it is sometimes referred to as Manganese Madness!

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